Remarks

The applicant has amended the claims in order to define the invention more particularly and distinctly so as to overcome the technical rejections and define the invention patentability over the prior art.

The Objection to punctuation

The applicant has corrected the punctuation on all the claims to include appropriate the semicolons and periods.

Rejection to Claim 4 under § 112

Claim 4 was rejected for failing to distinctly claim the subject matter and for the use of the indefinite phrase "such as" in the claim.

The applicant has amended Claim 4 to better describe and specify the chipless tag circuit as being comprised of one or more resonant circuits, and composed of a planar metal coil and capacitance. This description was kept brief, since this type of tag circuit is fairly well-known prior art and is not in itself the central aspect of the present invention.

Given the amendment to Claim 4 as well as some additional description in the Specifications (first paragraph of Detailed Description), the applicant submits that Claim 4 complies with § 112 and therefore requests that rejection of Claim 4 be reconsidered.

The References and Differences of the Present Invention Thereover

Before discussing the remaining rejected claims, the applicant will first discuss the references cited by the examiner and the general novelty of the invention and its unobviousness over the references.

The references by Eberhardt (US 6,580,369 and US 6,404,339) describe an electronic label comprised of a tag IC circuit and capacitively-coupled antenna elements. The code is contained in the tag circuit. It is easiest to compare this invention to other inventions through the use of a simple illustration shown below:

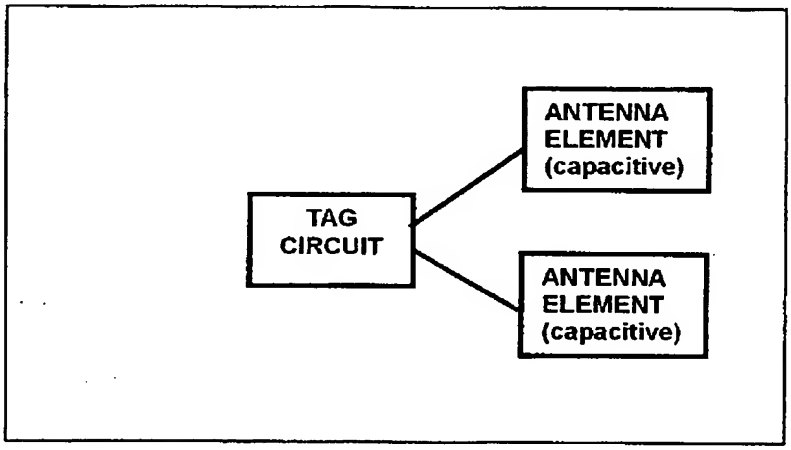

Illustration for Eberhardt

In the reference by Ahlstrom (US 6,222,452), the reference describes an electronic label comprised of a tag IC circuit and inductively-coupled antenna elements. The code is contained in the tag circuit. This is the configuration most commonly used in the industry today. It is easiest to compare this invention to other inventions through the use of a simple illustration shown below:

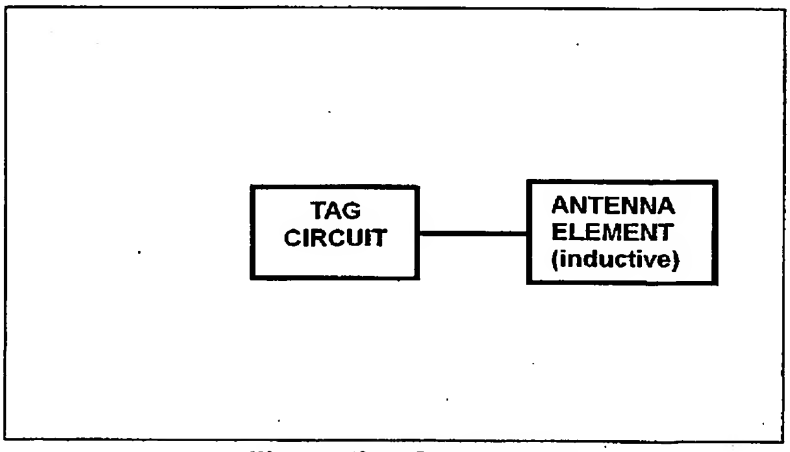

Illustration for Ahlstrom

In the reference by Lastinger (US 6,104,311), the reference describes an electronic label comprised of multiple tag IC circuits and multiple antenna elements. It is easiest to compare this invention to other inventions through the use of a simple illustration shown below. In the invention described in this reference, many codes are possible from a single electronic label because there

are many possible combinations of tag circuits and antenna elements. Different codes can be selected by changing the connection points between tag circuits and antenna elements.

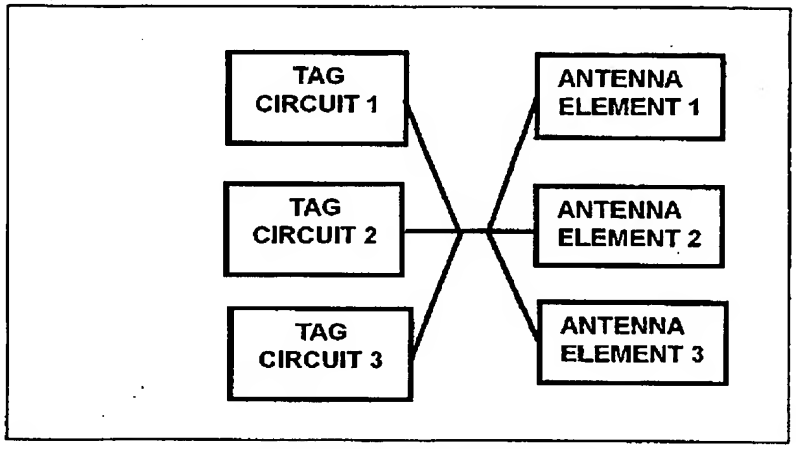

Illustration for Lastinger

The reference by Wrighton (US 4,717,673) discloses the structure and manufacture of several polymer-based electrochemical devices. Several potential applications of these devices are described, but the use of these devices in an electronic label is not mentioned or implied anywhere in the reference.

In the present invention, the fundamental difference over the prior art, is the addition of a "*marker region*" that is distinct from the tag circuit and distinct from the antenna elements. It is easiest to compare this invention to other references through the use of a simple illustration shown below:

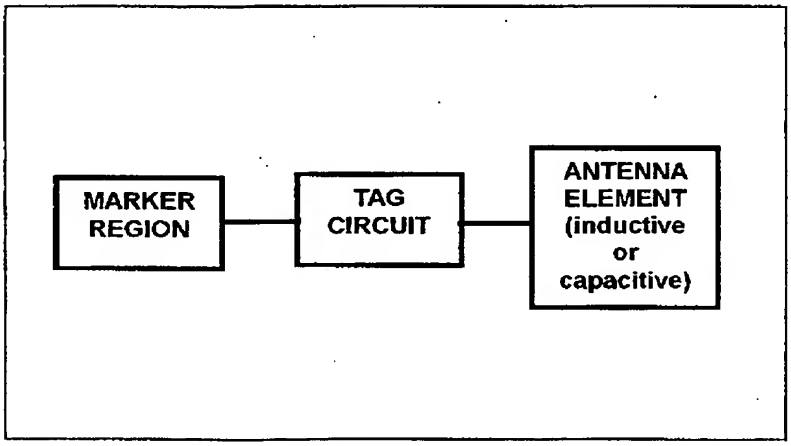

Illustration for Present Invention by the Applicant

In the present invention, there is a single tag circuit and a single set of antenna elements. The marker region, which is completely absent from all of the references, is coupled to the tag circuit and the electrical properties of the marker region (for example, its resistance) causes a change in the information code produced by the electronic label. If an attempt is made to reproduce this label and the electrical properties of the marker region are not duplicated, then

the information code of the label will change, thus making the label detectable as a counterfeit label.

If the marker region is coupled to an external object or article, as described in claims 11-15 of the present invention, the information code of the label is also dependent on the electrical properties of the object. For example, such a label can be placed near the cork on the inside of a wine bottle in order to certify its authenticity and state. If the wine in the bottle is contaminated in some way or replaced with another liquid, the label will be able to detect this change because the electrical properties of the marker region will change. This same label can be used to detect any contamination or tampering of other contents as well, such as bottle of baby formula or milk or soft drinks or medicines. Because of the utility of this invention for detecting and monitoring changes in the label and object, the title of the present invention has been chosen to be "Electromagnetic ID Label for Anti-Counterfeiting, Authentication, and Tamper-Protection."

In summary, the Applicant would like to point out that all other references *do not* include the use of said "marker region", which is a unique aspect of this invention. Also, *none* of the references cited are specifically suited for the purpose of anti-counterfeiting, authentication, or tamper-protection, which is the primary purpose of this invention.

More specific comments regarding the references are mentioned in the following sections.

Regarding Rejections of Claims 1, 2, 5, and 6 Based on Eberhardt

Claims 1, 2, 5-6 are rejected under 35 U.S.C. § 102(e) as being anticipated by Eberhardt (US 6,580,369). The Applicant respectfully disagrees for the following reasons:

(1) Features claimed in the present invention are lacking in the references. As mentioned previously, the presence and the use of a distinct marker region is completely absent from the teachings of Eberhardt, and is not suggested by Eberhardt. The Applicant notes with appreciation that parts of the invention described by Eberhardt can be created with printed conducting ink or a variety of substrates. However, the presence of a marker region (or similar element) is completely absent. In Figures 1-6 of Eberhardt (US 6,580,369), elements numbered 104 and 106 are clearly described as antenna elements ("electrically coupled antenna"), as quoted from lines 40-55 in column 2 of Eberhardt (US 6,580,369). In Figure 7 of the other reference by Eberhardt (US 6,404,339), elements 428 and 430 are also clearly described as being "antenna elements", as quoted in lines 27-40 of Eberhardt (US 6,404,339). Figure 7 of Eberhardt (US 6,404,339) also includes an additional element (numbered 458) which is an electronic display; this element is not an antenna, but its sole purpose is to display visual information and has no relevant or similarity to the "marker region" included in the present invention. In contrast to the Figures 1-6 from Eberhardt (US 6,580,369) and Figures 7-8 of Eberhardt (US 6,404,339), Figure 4 of the

present invention by the Applicant clearly shows the presence of the additional marker region, which is the novel aspect of the present invention.

(2) The capacitively-coupled antenna elements included in the references by Eberhardt are solely used to couple the data and power from the electronic label to the external tag reader. These elements thus function strictly as antennas and do not modify the information (ID code) of the label in any way; the information in this case is fixed (not changing), and can only be changed through programming by an external reader. This is a clear distinction from the "marker region" of the present invention, which is not an antenna, and serves to modify the information (ID code) of the tag; in this case, the ID code is variable and not fixed. Thus, the antenna elements described in the teachings of Eberhardt cannot function in the same way as the marker regions disclosed in the present invention.

Therefore, for the above-stated reasons, the Applicant respectfully requests reconsideration of the rejections under 35 U.S.C. § 102(e).

In addition, the Applicant notes that the features described in the present invention, and absent from the teachings of Eberhardt, enable the present invention to have a dynamically varying ID code that can be controlled by the electrical properties of the marker region as also the article itself. This is contrasted to a conventional electronic label that returns either a fixed ID code or a simple sensor value (for example temperature). These features of the present invention thus provide new and unexpected functionality over prior art, meeting the requirements of 35 U.S.C. § 103(a).

Regarding Rejection of Claim 20 Based on Eberhardt

Claims 20 is rejected under 35 U.S.C. § 102(e) as being anticipated by Eberhardt (US 6,580,369).

According to item #7 of the Office Action:

> "Regarding Claim 20, Eberhardt clearly discloses the information generated by the tag circuit being encrypted by a function that is dependent on the electronic properties of the marker region."

The Applicant respectfully disagrees. The word "encryption" is not mentioned anywhere in the reference by Eberhardt, nor is the use of encryption implied. The definition of encryption is an effective scrambling or additional coding of another ID code based on a particular parameter or encryption key. This in not implied in the Eberhard reference or in any of the other references. In addition, as mentioned previously, the Eberhardt reference does not even mention a marker region.

For clarity, an example of simple encryption can be given here. Let's say that the non encrypted ID code is 26, which is represented in binary as "11001". Then let's say that the electrical properties of the marker region produced a parameter value of 19 (for example, it's electrical resistance in normalized units), which is represented in binary as "10011". This parameter value can then be

used as a simple "encryption key" to scramble the information (ID code). One such function to do this is a logical XOR. In this case, the code output by the tag would be 11001 XOR 10011 = 01010, which is equal to 10 in decimal notation. If the marker region were changed in some way (due to tampering or counterfeiting) its parameter value would change from 19 to something else. Instead of 19, if the new value were, 18, for example, then the new encrypted code would be 26 XOR 18 = 11001 XOR 10010 = 01000 = 8.

As we can see from this simple example, the marker region can be used to determine the mathematical function that is used to encrypt or scramble the information (ID code) of the tag. The electrical properties of the marker represent a parameter that is part of the mathematical function. This provides an additional means of preventing counterfeiting of the tag and also makes the data more difficult to copy and reproduce.

The simple XOR function used here is often used in simple electronic devices and is appropriate for devices such as electronic labels. However the simple encryption algorithm used here to scramble the ID code is just one of many possible algorithms and mathematical functions known in the world for processing and securing digital information. The fundamental novel and non-obvious point here is that the properties for the market region can be used as a parameter for encrypting or scrambling the information code of the tag.

In order to make this point slightly more clear, Claim 20 of the present invention has been amended and also a new claim (21) has been added to better describe the specific embodiment.

Therefore, for the above-stated reasons, the Applicant respectfully requests reconsideration of this rejection under 35 U.S.C. § 102(e).

In addition, while the use of encryption is known in the art and employed on some electronic security labels, the use of an encryption parameter that is derived from the physical electrical properties of the label itself (and the article to which it is attached), is an unobvious and unexpected feature, and thus warrants reconsideration under 35 U.S.C. § 103(a) as well.

Regarding Rejection of Claim 3

Claim 3 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Eberhardt (US 6,580,369) in view of Wrighton (US 4,717,673). The Applicant respectfully disagrees for the following reasons:

(1) Features claimed in the present invention are lacking in the references. The use of a "marker region" that causes a change in the information content of the label is absent from both Eberhardt and Wrighton. The reference by Wrighton (US 4,717,673) is limited to the description of a specific category of polymer electrochemical devices that can be potentially used as a transistor or capacitor. In the reference by Eberhardt (US 6,580,369), as mentioned previously, the presence and the use of a distinct marker region is completely absent from the teachings of Eberhardt, and is not suggested by Eberhardt. The Applicant notes with appreciation that parts of the invention described by Eberhardt can be created with printed conducting ink or a variety of substrates. However, the presence of a

marker region (or similar element) is completely absent. In Figures 1-6 of Eberhardt (US 6,580,369), elements numbered 104 and 106 are clearly described as antenna elements ("electrically coupled antenna"), as quoted from lines 40-55 in column 2 of Eberhardt (US 6,580,369). In Figure 7 of the other reference by Eberhardt (US 6,404,339), elements 428 and 430 are also clearly described as being "antenna elements", as quoted in lines 27-40 of Eberhardt (US 6,404,339). Figure 7 of Eberhardt (US 6,404,339) also includes an additional element (numbered 458) which is an electronic display; this element is not an antenna, but its sole purpose is to display visual information and has no relevant or similarity to the "marker region" included in the present invention. In contrast to the Figures 1-6 from Eberhardt (US 6,580,369) and Figures 7-8 of Eberhardt (US 6,404,339), Figure 4 of the present invention by the Applicant clearly shows the presence of the additional marker region, which is the novel aspect of the present invention.

(2) The capacitively-coupled antenna elements included in the references by Eberhardt are solely used to couple the data and power from the electronic label to the external tag reader. These elements thus function strictly as antennas and do not modify the information (ID code) of the label in any way; the information in this case is fixed (not changing), and can only be changed through programming by an external reader. This is a clear distinction from the "marker region" of the present invention, which is not an antenna, and serves to modify the information (or ID code) of the tag;

in this case, the ID code is variable and not fixed. Thus, the antenna elements described in the teachings of Eberhardt cannot function in the same way as the marker regions disclosed in the present invention.

(3) There is nothing in the references by Wrighton (US 4,717,673) or Eberhardt that suggests the combination of these teachings or why this combination would be obvious. No justification is given for combining them and no advantages are given for combining them.

(4) The Applicant also notes that the reference from Wrighton (US 4,717,673) that teaches the existence of polymer-based transistors issued over ten years before the filing date of Eberhardt (US 6,580,369), and the existence of polymer transistors has been known in the industry for at least a decade. If the combination were so obvious to a person having ordinary skill in the art, it would have likely been included in the teachings of Eberhardt.

In addition, the Applicant notes that the features described in the present invention, and absent from the teachings of Eberhardt, enable the present invention to have a dynamically varying ID code that can be controlled by the electrical properties of the marker region and also the electrical properties of the article itself. This is contrasted to the prior art conventional electronic label that returns either a fixed ID code or a simple sensor value (for example temperature). These novel features of the present invention thus provide new and unexpected functionality over the prior art, meeting the requirements of 35 U.S.C. § 103(a).

Therefore, for the above-stated reasons, the Applicant respectfully requests reconsideration of the rejections under 35 U.S.C. § 103(a).

Regarding Rejection of Claims 4 and 15

Claims 4 and 15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Eberhardt (US 6,580,369) in view of Lastinger (US 6,104,311). The Applicant respectfully disagrees for the following reasons:

(1) Features claimed in the present invention are lacking in the references. The use of a "marker region" that causes a change in the information content of the label is absent from Eberhardt and Lastinger. The reference by Lastinger (US 6,104,311) describes an electronic label comprised of multiple tag IC circuits (#26) and multiple antenna elements (#24), as shown in Figures 2, 3, and 5 of Lastinger (US 6,104,311) . The Applicant notes with appreciation that in the invention of Lastinger, it is possible to generate different ID codes from a single electronic label by changing the connection between the different tag IC circuits and different antennas. In the present invention, there is a single tag circuit and a single set of antenna elements, and the information or ID code of the electronic label is changed by the variation of the electrical properties of the marker region. This is very different

from the invention disclosed by Lastinger. In the reference by Eberhardt (US 6,580,369), as mentioned previously, the presence and the use of a distinct marker region is completely absent, and is not suggested by Eberhardt. The Applicant notes with appreciation that parts of the invention described by Eberhardt can be created with printed conducting ink or a variety of substrates. However, the presence of a marker region (or similar element) is completely absent. In Figures 1-6 of Eberhardt (US 6,580,369), elements numbered 104 and 106 are clearly described as antenna elements ("electrically coupled antenna"), as quoted from lines 40-55 in column 2 of Eberhardt (US 6,580,369). In Figure 7 of the other reference by Eberhardt (US 6,404,339), elements 428 and 430 are also clearly described as being "antenna elements", as quoted in lines 27-40 of Eberhardt (US 6,404,339). Figure 7 of Eberhardt (US 6,404,339) also includes an additional element (numbered 458) which is an electronic display; this element is not an antenna, but its sole purpose is to display visual information and has no relevant or similarity to the "marker region" included in the present invention. In contrast to the Figures 1-6 from Eberhardt (US 6,580,369) and Figures 7-8 of Eberhardt (US 6,404,339), Figure 4 of the present invention by the Applicant clearly shows the presence of the additional marker region, which is the novel aspect of the present invention.

(2) The combination of features of Lastinger (US 6,104,311) and Eberhardt (US 6,580,369) is not suggested or implied in either reference. Even if it

were possible to apply the use of the chipless resonant circuits described in Lastinger to the label described by Eberhardt, this label would not serve the purpose of the present invention (which is to help detect and prevent tampering or counterfeiting). Therefore, it is not clear what is the advantage of combining the features of Lastinger and Eberhardt.

(3) Combining the features of Lastinger (US 6,104,311) and Eberhardt (US 6,580,369) is not possible given the constraints of each. The Office Action states: "It would have been obvious at the time the invention was made to a person having ordinary skill in the art to include chipless materials structures comprising one or more resonant circuits to the label of Eberhardt as taught by Lastinger for the purpose of processing information." The Applicant respectfully disagrees, because the resonant circuit contains a coil and is necessarily inductively-coupled; the resulting circuit cannot be energized through capacitive-coupling alone.

Therefore, for the above-stated reasons, the Applicant respectfully requests reconsideration of the rejections of claims 4 and 15 under 35 U.S.C. § 103(a).

Regarding claim 15, the Office Action also states: "Regarding claim 15, Eberhardt discloses the marker region being electrically coupled to the object. (col 2, lines 50-64)."

The Applicant respectfully disagrees. In the entire Eberhardt reference (US 6,580,369), there is no mention whatsoever of the object or article to which the

label is applied. However, in the other Eberhardt reference (US 6,404,339), in Col 5, lines 13-24, there is some mention of coupling the antenna to an external object or article:

> "In a preferred embodiment (not shown), tag common electrode 28 may be arranged to couple to a person or animal. In this manner, tag common electrode 28 is coupled to ground by means of the person or animal. Tag common electrode 28 may also be arranged to couple to an article (not shown). In this manner, tag common electrode 28 is coupled to ground by means of the article."

In this description by Eberhardt, the electrode on the label is simply being used as an antenna to couple the tag circuit to ground potential. In fact, in Figures 7 and 8, these electrode regions on the label are referred to as "antenna elements" (Eberhardt reference US 6,404,339, col 9, lines 22-42). In addition, this coupling to the object is simply used to improve the strength of the signal transmitted by the electronic label; this coupling does not change the information code of the label. Further examples of electronic labels with a coupling to ground can be found in other patents co-authored by the Applicant (Richard Fletcher) and Eberhardt (e.g. US 6,411,213 and US 6,611,199).

By contrast, claim 15 of the present invention employs a "marker region" that is distinct from the antenna elements (as shown in Figure 4). In addition, the coupling to the external object is purposely intended to change the information content of the label.

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Paper No. 6

Notice of Non-Compliant Amendment (37 CFR 1.121)

The amendment document filed on 4/9/04 is considered non-compliant because it has failed to meet the requirements of 37 CFR 1.121, as amended on June 30, 2003 (see *68 Fed. Reg. 38611*, Jun. 30, 2003). In order for the amendment document to be compliant, correction of the following item(s) is required. Only the corrected section of the non-compliant amendment document must be resubmitted (in its entirety), e.g., the entire "Amendments to the claims" section of applicant's amendment document must be re-submitted. 37 CFR 1.121(h).

THE FOLLOWING CHECKED (X) ITEM(S) CAUSE THE AMENDMENT DOCUMENT TO BE NON-COMPLIANT:

- [X] 1. Amendments to the specification:
  - [ ] A. Amended paragraph(s) do not include markings.
  - [ ] B. New paragraph(s) should not be underlined.
  - [X] C. Other You must identify the pg. and line number or para. # as instructions to your specification amendments.
- [ ] 2. Abstract:
  - [ ] A. Not presented on a separate sheet. 37 CFR 1.72.
  - [ ] B. Other _____
- [ ] 3. Amendments to the drawings: _____
- [X] 4. Amendments to the claims:
  - [ ] A. A complete listing of all of the claims is not present.
  - [ ] B. The listing of claims does not include the text of all claims (including withdrawn claims)
  - [X] C. Each claim has not been provided with the proper status identifier, and as such, the individual status of each claim cannot be identified.
  - [ ] D. The claims of this amendment paper have not been presented in ascending numerical order.
  - [X] E. Other: Amended is not a proper Status identifier, should read "Currently Amended". All amended claims should include markings.

For further explanation of the amendment format required by 37 CFR 1.121, see MPEP Sec. 714 and the USPTO website at http://www.uspto.gov/web/offices/pac/dapp/opla/preognotice/officeflyer.pdf.

If the non-compliant amendment is a PRELIMINARY AMENDMENT, applicant is given ONE MONTH from the mail date of this letter to supply the corrected section which complies with 37 CFR 1.121. Failure to comply with 37 CFR 1.121 will result in non-entry of the preliminary amendment and examination on the merits will commence without consideration of the proposed changes in the preliminary amendment(s). This notice is not an action under 35 U.S.C. 132, and this ONE MONTH time limit is not extendable.

If the non-compliant amendment is a reply to a NON-FINAL OFFICE ACTION (including a submission for an RCE), and since the amendment appears to be a *bona fide* attempt to be a reply (37 CFR 1.135(c)), applicant is given a TIME PERIOD of ONE MONTH from the mailing of this notice within which to re-submit the corrected section which complies with 37 CFR 1.121 in order to avoid abandonment. EXTENSIONS OF THIS TIME PERIOD ARE AVAILABLE UNDER 37 CFR 1.136(a).

If the amendment is a reply to a FINAL REJECTION, this form may be an attachment to an Advisory Action. The period for response to a final rejection continues to run from the date set in the final rejection, and is not affected by the non-compliant status of the amendment.

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Rev. 10/03